

Read this Book CAREFULLY Before You Attempt to Uncrate, Set-Up or Adjust Incubator

**DIRECTIONS FOR OPERATING**  
**Standard Cyphers Incubators**

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**LATEST PATTERN**

**FIRE-PROOFED**

**INSURABLE**

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**CYPHERS INCUBATOR COMPANY**

*Factory and Home Offices*

**BUFFALO, N. Y., U. S. A.**

**BRANCHES:** New York City, N. Y.    Boston, Mass.    Chicago, Ill.    Kansas City, Mo.    Oakland, Cal.    London, England.



## IMPORTANT TO EVERY OPERATOR — READ CAREFULLY

In the following pages we have endeavored to anticipate the many problems that operators, living in all parts of the world and hatching under greatly varying conditions, may be called upon to solve and have explained at considerable length why they happen, how to prevent them, or have given the remedy.

This information has been gained from years of practical experience, and if followed carefully will surely bring good results.

We can hardly conceive of a condition arising that is not fully covered in these pages, and we hope, therefore that operators will read every word carefully with the idea of preventing and correcting any possible mistake.

In the event that you find it necessary to write to one of our offices for further information we must assume that nothing herein covers your case, and it will be absolutely necessary, therefore, for you to mention in detail exactly how you handle your stock, care for the eggs, handle the machine during the entire period of incubation, also the location of the machine, and the results secured. The simple statement, "I followed the directions," throws no light on the situation for us.

Naturally the operator aims to follow the directions as he or she understands them, but we all realize that two people can get entirely different ideas from the same sentence—the crowded condition of our courts proves that.

It is our aim to have each and every incubator manufactured by us produce the results of which it is capable—that means hatch a vigorous chick from every hatchable egg with the minimum amount of care.

The things necessary to accomplish this result can be summed up in a few words as follows:

FIRST—The breeders must be matured and in good condition. Immature, old, fat, sickly or lousy stock or birds that have been laying for months cannot produce eggs that will hatch well.

SECOND—House the stock comfortably, provide plenty of water and grit—make them scratch in litter for all whole grain, give bran dry or steamed, also steamed oats and alfalfa or clover in abundance. The tendency is to feed too much food of a fattening nature and not enough bulky and green food.

THIRD—The eggs must be gathered frequently to prevent chilling and other hens sitting on them. Keep them quietly in a temperature of 50 to 60 and turn a little every two days if necessary to hold for many days.

FOURTH—The best results will be secured if the incubator is located in a well-ventilated room or basement of fair size where the temperature ranges between 50 and 65. It is dangerous to expose eggs to a temperature much below 45.

An incubator should not be placed where there is a draft, where the sun shines on it, or where the floor vibrates from walking or slamming of doors.

FIFTH—Use eggs normal in size and shape, as near of one age as possible—the fresher the better. EGGS FROM THE SAME VARIETY OF FOWLS GIVE THE BEST RESULTS. For instance, Leghorn eggs and Plymouth Rock eggs will not dry down uniformly. The shells differ in thickness and texture, therefore the ideal ventilation for one is not suited for the other. Leghorns will hatch nearly twenty-four hours earlier under the same treatment. As this condition exists throughout the different classes you can realize the advantage of having all of the eggs from the same breed of fowls.

Some operators having more than one machine, and desiring to incubate eggs from different varieties at the same time, start the eggs from the heavy birds from eighteen to twenty-four hours ahead of the others, and when the eggs are turned for the first time put all the eggs in one machine. This will bring very satisfactory hatches, but a uniform lot of eggs is the ideal condition.

SIXTH—Satisfy yourself that your machine is properly adjusted, run it a couple of days until it is thoroughly warmed through, be sure it regulates perfectly, then put in the eggs and follow the directions to the letter.



# DIRECTIONS FOR OPERATING STANDARD CYPHERS INCUBATORS

## (LATEST PATTERN)

The following directions are based upon the actual experience of successful operators who have used Cyphers Incubators for several years, and should be followed in preference to the suggestions of neighbors whose experience has been limited or who have used other makes of incubators.

### SELECTING LOCATION

In selecting a place to operate the Standard Cyphers Incubator, it is not necessary to exercise as great care as with other makes. Any unheated room, with a solid floor, will answer the purpose. If the machine is to be run during warm weather, a dry, cool cellar (one free from gas or decaying vegetable matter) that can be easily ventilated, is desirable. The conditions are best in a cellar or room where the temperature does not get above 65 degrees; however, many customers operate the Cyphers successfully in much warmer rooms.

It is not safe to handle eggs in a temperature much below 45 degrees. We would advise, therefore, that a location be selected where the temperature will not go below this point.

### SETTING UP AND ADJUSTING

The first thing to do after uncrating the machine is to remove the contents of the egg chamber and carefully read this circular of directions.

The front legs go on first, then the machine should be elevated and the rear legs screwed firmly in place. See that the legs set tightly against the sides, with the shoulders against the bottom of the machine.

Now place the machine where you intend to locate it and see that it is as nearly level as possible. Unless it is perfectly level it will not heat evenly. Use a spirit level on top of the machine to test it both from back to front and from side to side.



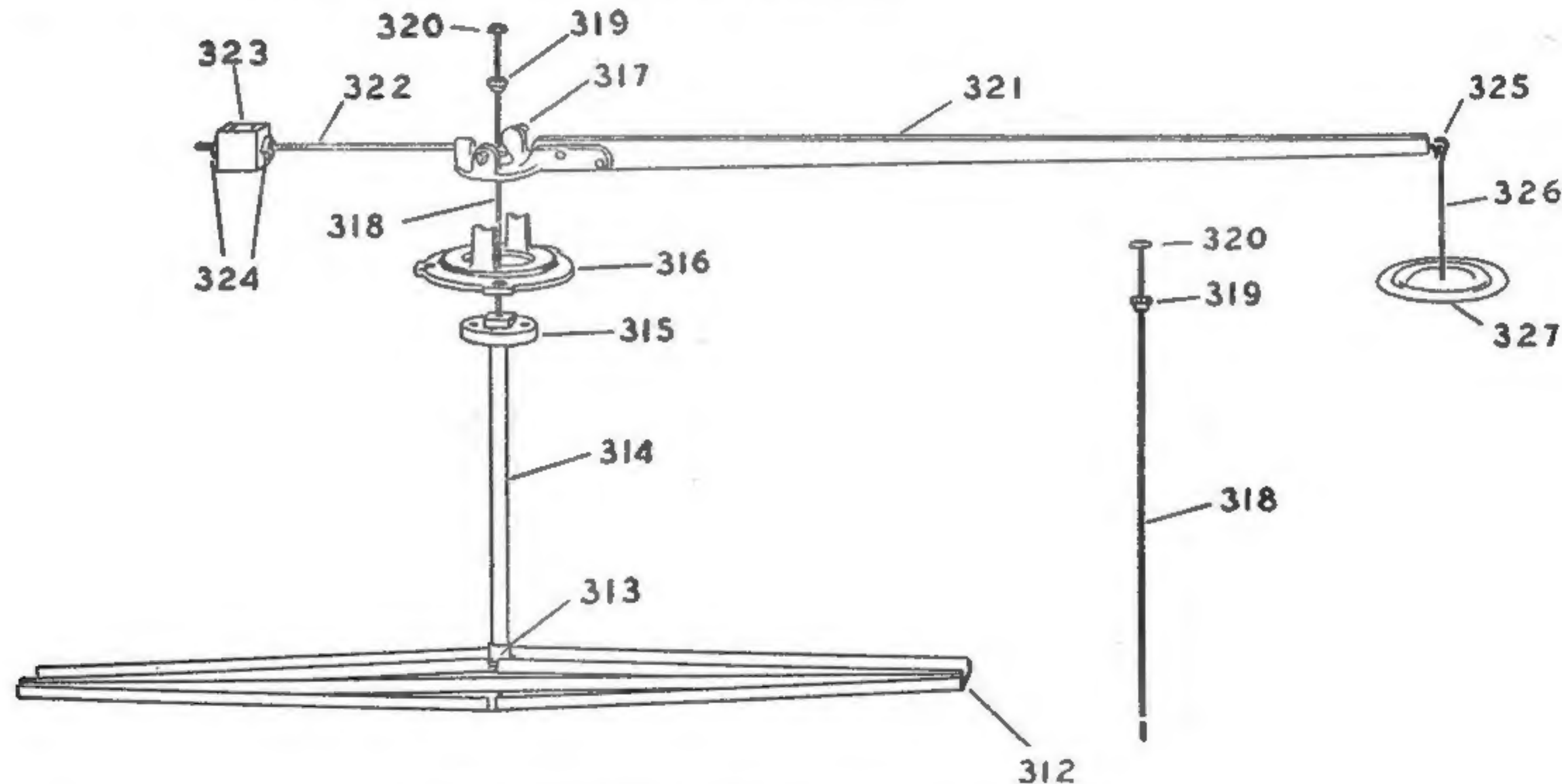
Illustration, from photograph, showing nursery drawers in No. 2 and No. 3 Standard Cyphers Incubator. Left hand nursery drawer is in position; right hand drawer is let down and ready to draw out

Next place the Lamp Enclosure in position.

The direct heat flue of the heater passes through and extends about one-half inch below the top of the enclosure. When in position the top of the enclosure rests against the bottom of the fresh air flue of the heater, and is held securely in place by means of two eye bolts, which will be found attached to the lugs which space the fresh air flue from the direct heat flue.

When guiding the direct heat flue through hole in top of the enclosure, be particular to have the ends of the eye bolts, referred to above, drop into the holes provided for them in the top of the enclosure.

Hold the enclosure in place and screw the wing nuts on to the eye bolts, drawing the top of the enclosure tightly against the bottom of the fresh air flue. The nuts should be turned to a position that will not allow the wings to interfere with the lamp burner, when it is brought in contact with the direct heat flue.



**The Standard Cyphers Regulating Device**

On this page we illustrate the different parts of the regulating device. The detachable parts will be found fastened securely to the egg tray. All regular parts received with the machine should not be separated from it, since they have been specially fitted and adjusted for this particular machine.



The different parts of the regulating device, as shown herewith, are as follows:

312—Thermostat.

313—Brass nipple, attached to upper thermostat bar, by which it is fastened to the connecting tube.

314—Metal connecting tube, by which the thermostat is made fast to the center guide casting.

315—Center guide casting, which will be found screwed fast to the top of the machine. Thermostats are always placed in position before the incubator leaves the factory.

316—Base casting, which fits over and around the center guide casting and supports the pivot casting and regulator arm.

317—Pivot casting, to which is attached the wooden arm and counterpoise.

318—Connecting rod.

319—Adjusting, or steel, nut on connecting rod.

320—Lock nut on connecting rod.

321—Wooden arm of regulator.

322—Counterpoise rod.

323—Counterpoise weight. The position of this weight is fixed when the machine leaves the factory and should not be changed.

324—Two lock nuts, one on either side of the counterpoise weight, which fasten it in position.

325—Screw-eye in end of wooden arm.

326—Wire, supporting disc.

327—Tin disc.

The regulator arm, which consists of the pivot casting (317), with the metal rod and counterpoise weight (322, 323), and the long wooden arm (321) extending in opposite directions, should be placed on the top of the machine so that the short arms on the sides of the iron casting will rest with the sharp edges down in the grooves in the posts of the base casting (316), which comes already screwed to the top of the machine.

The wire (326) attached to the round tin disc (327) should hang from the screw-eye in the end of the wooden rod so that the tin disc will lie down flat and completely cover the opening in the asbestos-covered heater at end of the machine.

Be sure that you hang the tin disc right side up. The small hook in end of disc wire (326) should be inserted in the screw-eye.

Pass the short-threaded end of connecting rod (318) down through the small hole in the iron casting (317) and down through the thermostat (312), which is the spring-like arrangement of steel and zinc which hangs inside the machine. Screw the rod through the threaded hole in the piece of brass, which is firmly spun in the center of the lower zinc bar of the thermostat.

It is important that this rod be screwed up tightly with the fingers to prevent connecting rod from turning when adjusting steel nut (319).

The steel nut (319) should be on the end of connecting rod, outside the machine and above the pivot casting (317).

The small counterpoise (323) on the metal rod is locked in place before the machine leaves the factory. **DO NOT MOVE THE COUNTERPOISE WEIGHT.** This is important, for, unless this counterpoise is in the proper position, the regulator will not adjust perfectly. Should the counterpoise become loose by accident, move it to such a position on the metal rod that a pressure of twelve ounces on the top of the wire connecting rod (with the rod loose from lower bar, the steel nut being screwed on to its full limit and all tension off) will raise the tin disc (327, page 2) slightly from the top of the heater. Then fasten the counterpoise in position by holding it firmly in one hand and setting the small square nuts tightly against the counterpoise to hold it securely in position.



In readjusting as above, THE LOWER END OF CONNECTING ROD MUST NOT TOUCH THE LOWER ZINC BAR OF THERMOSTAT, as it is necessary that all tension on the rod be released. When the twelve-ounce pressure is removed the tin disc will rest firmly and evenly over the opening in the heater. After fixing counterpoise weight in position, proceed to place connecting rod in position, as advised in preceding paragraphs.

The wooden arm should move freely, raising the tin disc about two inches before the rod begins to bind, or the counterpoise weight strikes the top of the machine. There should be no friction in any part. NEVER TRY TO REGULATE THE HEAT BY MOVING THE COUNTERPOISE. When two or more machines are purchased, be sure that the disc and lever arm are kept with the machines with which they are shipped. This is important, as the different parts of the regulator arms are adjusted to each individual incubator. See that the tin disc rests flat over the opening in the top of the heater, and that it shuts down evenly. If it does not, bend the wire on which it hangs slightly in the direction necessary to offset the unevenness. Once properly adjusted, it will not change. The effectiveness of the action of the regulator is largely dependent on the tin disc closing perfectly the hole over the heater, when down. If the hole is not completely covered, the action of the regulator is partially lost; and if there is a large gap on one side, the machine will not heat up in cold weather.

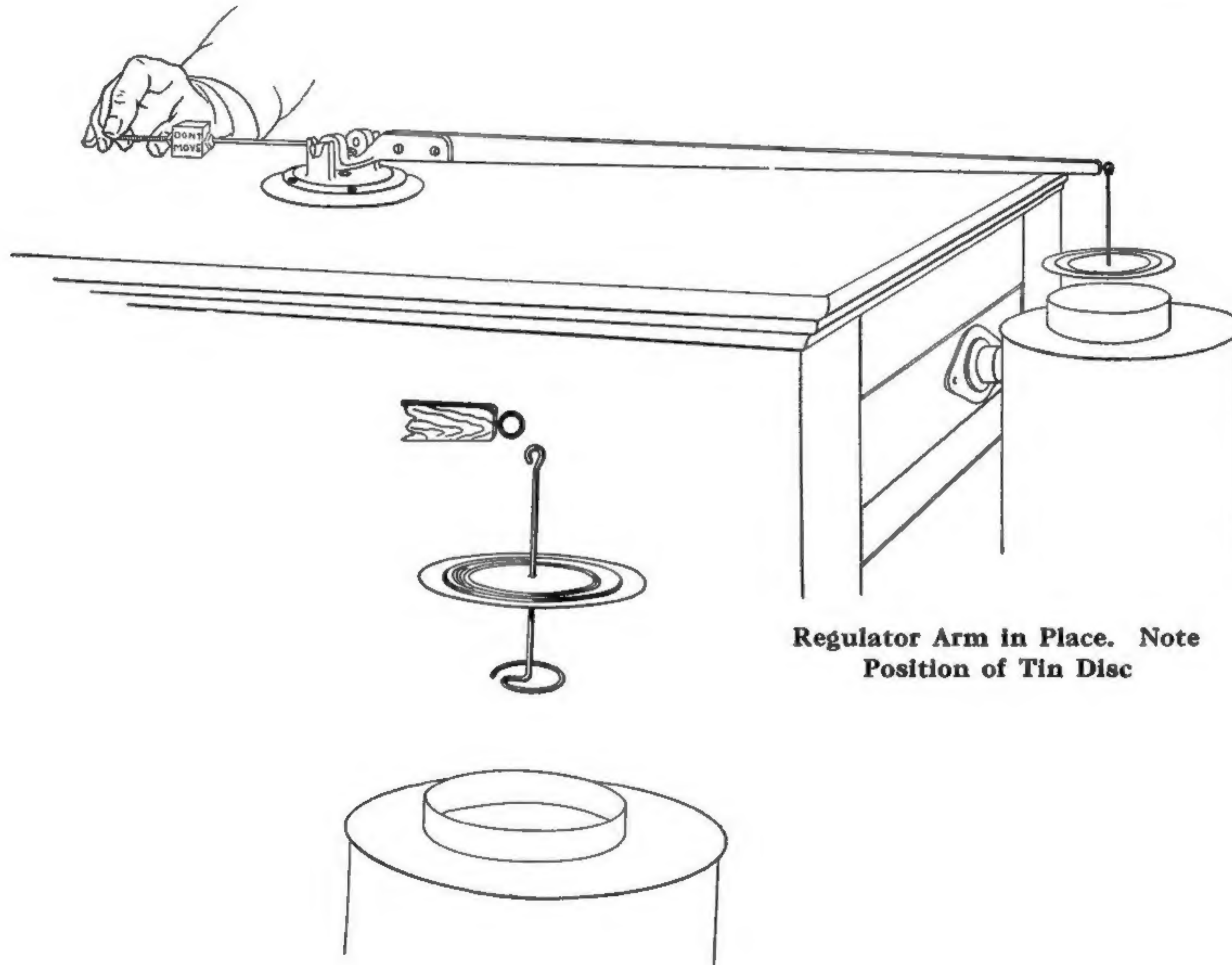
When assembling the regulator parts, before the steel nut has been tightened up, the tin disc should move up and down over a range of about two inches without friction anywhere. If it should happen that the wooden arm is not screwed to the finger of the iron casting at the correct angle, the wire rod may bind in the small hole through which it passes. To make sure that this is not the case, before screwing connecting rod into the brass piece in lower zinc bar or tightening up the steel nut, press the wooden arm downward until it rests on the edge of the machine over the heater. While holding the wooden arm down, raise the wire connecting rod one-half inch or more, and notice whether it falls back of its own weight without friction or binding.

Then raise the wooden arm until the tin disc hangs two inches over the heater. Then raise the wire connecting rod again, when it should drop back freely as before. If it should bind, it can be remedied by loosening the screws and setting the wooden arm at a little different angle on the casting.

If some time, through an accident, the round iron casting on top of the machine should get knocked slightly out of position, the disc would naturally swing to one side rather than directly over the hole in the top of heater.

Should this happen, loosen slightly the screws which hold the casting down, and after placing a wooden block against one of the upright arms, tap the block lightly with a hammer until the casting sets right to bring the tin disc directly over the opening in the top of heater. Strike the top of the machine with the hand, so as to joggle the sharp-edge bearings into their seats, and observe where the tin disc falls.

In the No. 2 and No. 3 incubators the thermostat hangs crosswise of the machine from front to back and lengthwise of the tray. In the No. 1 incubator it hangs lengthwise of the machine along the back, and care should be taken that neither of its ends touch the muslin diaphragm or woodwork. In the No. 0 incubator it hangs across the machine at the end opposite the heater, neither end touching.

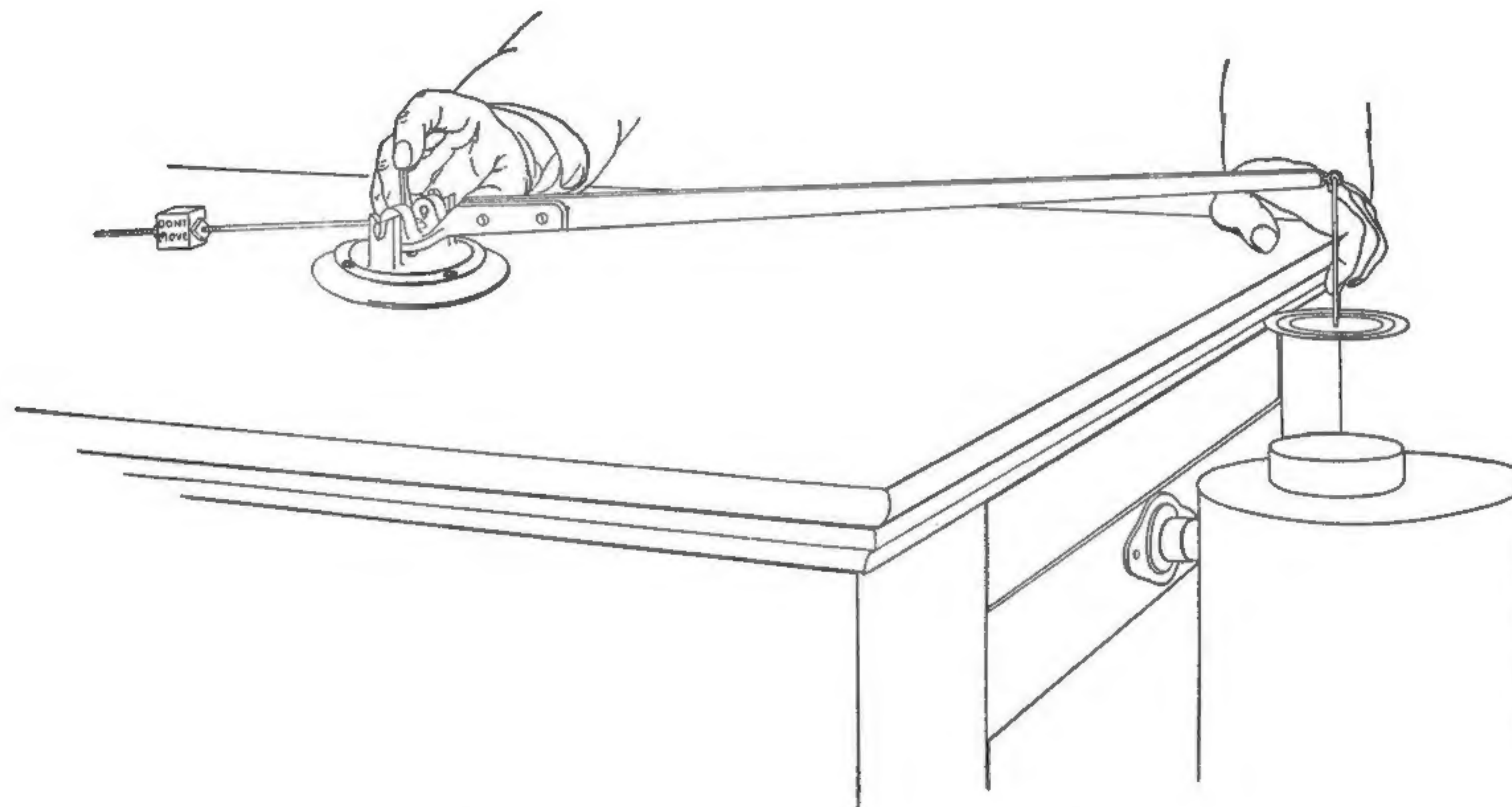


**Regulator Arm in Place. Note  
Position of Tin Disc**



Should the thermostat be pushed out of its correct position, turn it back by taking hold of the upper bar, and not of the lower one.

Great care should be taken to see that the regulator is set up properly, and that it works with absolutely no friction. It will then hold the temperature to a fraction of a degree. See that eggs do not interfere with regulator when tray is in position.



**Be Sure That Wooden Arm Moves Freely**

Hang the thermometer on the screw-eyes, which are placed for that purpose in the top of the egg-chamber. The thermometer should face the glass door, with the bulb toward the center of the machine. When in position, the bottom of the bulb should be just two inches from the wire-cloth bottom of the tray, measured from a point directly under the bulb.



THE WIRE ON WHICH THE THERMOMETER IS SUSPENDED IS A PART OF THE INCUBATOR, AND NOT A PART OF THE THERMOMETER. Therefore, in returning a thermometer, do not return the wire. IT IS VERY ESSENTIAL THAT THE THERMOMETER WIRE IS NOT ALLOWED TO BECOME SEPARATED FROM THE MACHINE WHICH IT ACCOMPANIES, or bent, or changed in any way. New thermometers are easily attached to the old wire by hooking the bent edge of the thermometer over the wire and bending in the two corners.

DO NOT CHANGE THE POSITION OF THE THERMOMETER. A place is provided for it before the machine leaves the factory. Hang it in its place, as indicated by the screw-eyes. OUR GUARANTY IS VOID IF YOU DO NOT USE THE CYPHERS INCUBATOR THERMOMETER IN THE PLACE WE HAVE PREPARED FOR IT; the proper position is indicated by the screw-eyes. We have determined this position to be the only proper place for taking the temperature of the egg chamber in each individual machine. If you change the position of the thermometer, you do so at your own risk. The thermometer in its proper position can be easily read by holding a lighted candle or lamp in front of the glass door of the machine, so that the light will fall on the thermometer.

In its suspended position the thermometer registers the air temperature, and this has been found by wide experience the best method to pursue in operating the Cyphers Incubator. By this method the eggs are one and a half degrees lower in temperature at the beginning of the hatch than is registered by the thermometer; but, as the animal heat is generated, the egg temperature gradually rises until the normal heat is attained, exactly the same as with a hen incubating.

Make sure that the mercury in the thermometer is well-settled, or it will register too high; and it follows that the egg temperature will be too low, the hatch drawn out and poor. The eggs should hatch on the twentieth and the beginning of the twenty-first day. If they hatch before, the heat has been too high. If the hatch drags past the twenty-first day, the heat has been too low, and may have been caused—the thermometer registering 103—(1) by the thermometer hanging with its bulb bottom more than two inches from the wire-cloth bottom of the tray; (2) too much cooling; (3) an imperfectly settled mercury column in the thermometer, or an otherwise imperfect thermometer. To settle the mercury column, take the thermometer in the hand, bulb end downward, and throw the hand downward with a sudden jerk, until no air bubbles appear in the tube, and the mercury is solidly connected.

TEST YOUR THERMOMETER BEFORE STARTING THE MACHINE. Do this at the beginning of each season and so avoid disappointment. Glass is fickle, and thermometers, in spite of all precautions, will sometimes vary. We use every known precaution to have thermometers strictly accurate at the required degrees of temperature, and we supply only well-seasoned tubes, but it sometimes happens that, in spite of all that can be done to insure perfection, the thermometer will vary a little after leaving our hands.

TO TEST THE THERMOMETER—Obtain a thermometer known to be absolutely correct between the degrees of 100 and 105; one that has a certificate of accuracy like a physician's clinical thermometer. Provide a vessel containing water heated to just 105 degrees, immerse both thermometers in the water, with their bulbs close together, and move them gently to keep the



water in motion. As the water cools down to 100 degrees, carefully note, on the thermometer being tested, every variation between 105 and 100. Run your machine in the future to allow for the variation. It does not matter if the thermometer does not register accurately if you know just what the variation is and can allow for it, so that you will be sure to have the right temperature in the egg chamber.

### THE START, AND FINAL ADJUSTMENT

Before lighting the lamp, be sure that the steel nut on wire connecting rod is unscrewed enough so that there will be about one-half of an inch play between the bottom of the nut and the pivot casting. Do not let the nut touch the pivot casting until temperature reaches 103 degrees with the machine empty. When the heat has reached this point, the steel nut on the wire connecting rod should be screwed down until it raises the disc from one-sixteenth to one-eighth of an inch above the opening in the top of the heater.

Screw the lamp burner into the collar of the lamp bowl, turning it as far as it will go easily. If this does not bring the wick turner on the opposite side of the lamp from the filler cap and directly across from same, turn the burner back to that point and fasten it securely in that position by means of the little adjusting device which is attached for that purpose.

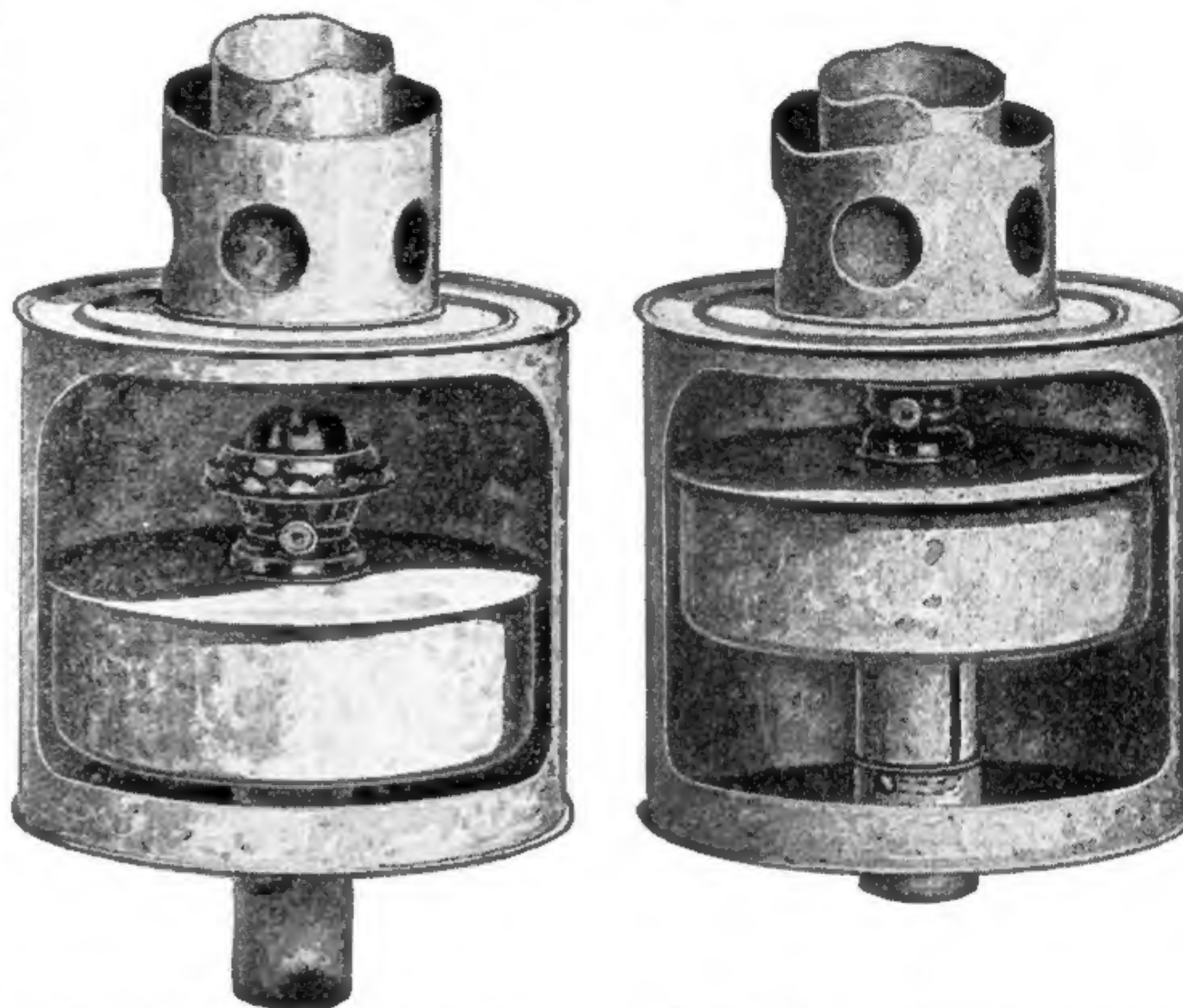
Fill the lamp *moderately* full of oil, see that the wick is well saturated, trim the wick square across, using the wick tube as a guide, then turn the wick up an eighth of an inch and snip off both corners. If properly done, the flame will appear round, full and clear.

Turn the blaze very low and slide the lamp into the enclosure as far as it will go. *The side of the lamp on which the filler cap is located must enter the enclosure first.*

Take a firm hold of the pipe extending below the enclosure which is the handle of the elevating device and raise the lamp until the burner engages the bottom of the direct heat flue, then turn the handle to the right as far as it will go, and the lamp will be locked in position. If the handle does not turn easily pull down on the bottom of the enclosure, at the same time shove up hard on the handle and turn it when the pin in the collar is opposite the cross slot in the elevating handle.

Turn up a moderate flame and if it does not burn clear and true **FIX IT**. *Always turn the flame down before lowering the lamp from the heater.*

Incubator Lamp Enclosure



Showing lamp in position ready to be elevated.

Showing lamp elevated and locked in position.



If the burner has been adjusted properly and the lamp inserted as directed the broad side of the flame will appear through the mica in the heater and the wick turner will be in the centre of the opening of the enclosure.

When first lighting the lamp, turn up only a MODERATE FLAME until the heater and the machine are warmed through, otherwise, as the heater becomes warm, THE LAMP FLAME DRAWS UP with the rising temperature, and THE LAMP IS THEN LIABLE TO SMOKE. If turned up so as to cause it to smoke badly, soot accumulates on the burner, and it will then burn with a large flame until the burner becomes overheated, and a puff of gas blows it out. After burner has been overheated so much as to blacken the metal, it should be repolished or replaced with a new one. The heater should be cleaned out thoroughly, and especially the hole (F) which leads from the inner to the outer flue. Take a cloth on a stiff wire and thoroughly clean flues (I) and (K) on the inside of the heater. (See illustration herewith.)

Use a bent wire to clean the tube (F) which connects the two openings near the top. This should be done from the flue (I) inside the heater. With intelligent care there is no more occasion for a smoky incubator lamp than is the case with an ordinary house lamp. And as there are no glass parts to break, the Cyphers arrangement is much safer than the house lamp.

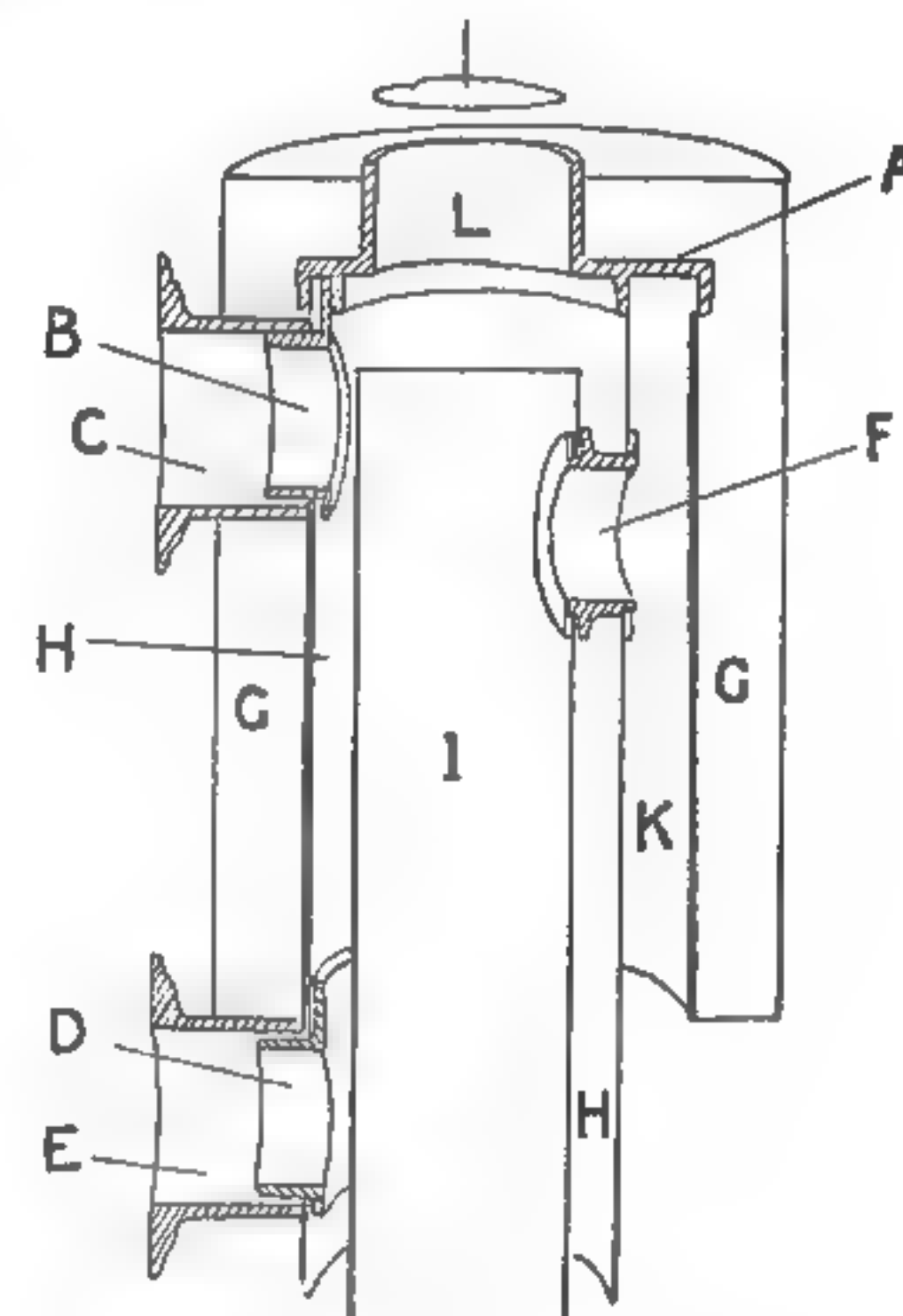
Read carefully—"Why Lamps Smoke" in back of this book.

#### Key to Illustration Showing Sectional View of Incubator Heater

A—Top cover casting. B—Warm air pipe casting. C—Upper flange casting. D—Exhaust pipe casting. E—Lower flange casting. F—Connecting chimney casting. G—Air-spaced asbestos jacket covering entire exterior of heater, 2 1/4 inches thick. H—Fresh air chamber, in which pure, fresh air drawn from outside the machine is thoroughly warmed before it passes into the machine through the warm-air pipe (B). Lamp fumes or carbonated air cannot gain access to this chamber. K—Large escape flue connecting with primary lamp flue or chimney (I) by means of connecting casting (F). This insures all lamp fumes and gases of combustion being discharged in the outer air, where they cannot gain access to the incubator. L—Escape flue for surplus heat, which is controlled by the tin disc shown above it, and which disc is operated by the regulating device.

After securing the proper adjustment, try to keep the lamp flame in the future as nearly the same height as when the regulator was adjusted, and high enough so that the tin disc is raised about one-sixteenth of an inch clear above the top of the heater. Do not run too high a flame on the lamp; keep only enough to supply the needed heat and to cause the tin disc to remain slightly raised. The regulator should always be adjusted by turning the steel nut on upper end of the wire connecting rod.

When starting the machine, do not permit the heat to run up too rapidly or too high. IF THE HEAT IN THE EGG CHAMBER IS PERMITTED TO RUN ABOVE THE HIGHEST POINT INDICATED ON THE THERMOMETER SCALE, THE THERMOMETER WILL BREAK AND BECOME USELESS.



Sectional View of Incubator Heater



## CARE OF MACHINE DURING HATCH

DO NOT PUT IN THE EGGS UNTIL YOU HAVE LEARNED TO REGULATE THE MACHINE. When the incubator is started for the first time, each season, it should be run empty for a day or two to get thoroughly warmed through. This will insure more perfect regulation.

AFTER THE EGGS ARE PUT IN, allow the temperature to rise to 103 degrees. If the temperature does not remain at 103 secure the proper adjustment by turning the little steel nut to a point that will suspend the tin disc about one-sixteenth of an inch above the top of the heater when the thermometer registers 103 degrees.

Never close the door of the incubator so as to cause a JAR, as it may disarrange the nice adjustment of the regulator.

It should be borne in mind that an accurate and finely adjusted thermostat, like that used in the Cyphers Incubator, should not be subjected to rough handling if it is to be expected to retain its efficiency. The Cyphers regulator is the most durable and the least liable to get out of order of any thermostat ever placed in an incubator; notwithstanding this, the operator should use reasonable care in handling his machine, taking care not to knock the egg trays against the thermostat or otherwise interfere with it. The thermostat is held in place by a small nipple riveted to the upper zinc bar, the nipple being screwed onto the metal tube which connects with the casting on the top of the machine. Rough usage might strip the thread from the nipple or tear one of the rivets from its proper place. Should this happen, the connecting rod will bind and the machine will not regulate properly. The thermostat is adjusted in its proper place before the machine leaves the factory, and, unless the machine is badly mishandled by freight handlers or by the operator, there is very little danger of its getting out of order.

Should you find anything wrong with the thermostat, write us promptly concerning it, and if necessary we will request you to return the thermostat to us for exchange or repairs.

IMPORTANT—In guaranteeing our incubators to do satisfactory work in your hands, we respectfully ask and expect you to report to us in detail all unsatisfactory hatches at the time they are taken off, also any trouble you may have in operating your machine, that we may correct any errors discovered or prompt you on any points which may be causing the trouble, or which you do not fully understand.

TRIM THE WICK AND FILL THE LAMP ONCE A DAY. KEEP THE BURNER CLEAN AND PUT IN A NEW WICK AFTER EACH HATCH.

In winter, if the night is coming off cold, and the temperature of the room is likely to fall, leave sufficient flame to raise the disc about one-eighth of an inch clear, which gives some reserve heat. In spring, if the day is coming off warm, turn down the flame until the disc lies close to the top of the heater, and the regulation will then be more effective under the rising outer temperature if the operator accustoms himself to adjusting the flame, etc.

Run the machine with the thermometer registering 103 degrees until the eggs begin to pip, when the temperature should be allowed to go to 103 1-2, and if the chicks are coming out quite lively it may even go up to 104 or 105. This is the natural result of the greater heat liberated below the thermometer as the chicks struggle to get out. A higher air temperature assists in the



liberation of the chicks, and no attempt should be made to lower it below 104 or 105: but let it go no higher. Too low a temperature at the time of exclusion is fatal to a good hatch. Do not open the door until the hatch is well over, as it will not injure the hatched chicks to remain in the machine. Leave them in until the hatch is well cleaned up.

In the double-tray machines, turn the trays end for end at night and from side to side in the morning, after the end of the first day. This reverses the ends of the trays at one turning and the sides at the other. In the single-tray machines, turn the tray from end to end night and morning.

**TURNING THE EGGS**—Beginning forty-eight hours after the eggs are placed in the incubator, it will be necessary to turn them twice a day. This can be easily and quickly accomplished by removing the eggs from the two middle rows, lying next to the partition in the center of the tray, and gently rolling the remainder of the eggs toward the center, filling the vacant places at the outer ends of the tray with the eggs removed from the center. The main object in turning eggs is to change their relative position in the machine and move them sufficiently to keep the germ from sticking against the shell. It is a wise plan to have a regular time for turning the eggs morning and night. When the eggs are to be tested make no turning on that day, as it will be accomplished in testing the eggs. Stop turning the eggs on the evening of the 18th day.

The eggs should always be turned before filling and caring for the lamp, otherwise kerosene might be transferred by the fingers from the lamp to the eggs. This must be avoided and the eggs should be handled with perfectly clean hands. It is NOT necessary to lay the eggs in rows, or to see that each egg is turned just half over, as some operators imagine. This mode of turning with a sloping tray is quick and much easier than with an extra tray. It also shifts the relative position of the eggs twice a day. This method cracks less eggs, and, altogether, is a feature of so great importance that, by its employment, five per cent. better hatches, on the average, can be secured. In adopting this method of turning, we simply take advantage, as in other features of our machine, of every point of merit known to artificial incubation.

All latest-pattern machines have their trays extend clear to the front of the egg-chamber. The tray is to be filled at start. Usually after first test, enough infertile eggs will have been removed to uncover the opening in the tray. After the eggs start to pip, the opening should be at the front with the screen turned back so that the newly-hatched chicks, as they come forward to the light, will fall through into the nursery. *When operating the No. 2 or No. 3 machines in a temperature lower than 50 degrees we advise leaving the screen closed until the first few chicks to hatch have dried off, when the screen should be turned back by reaching through the nursery draw doors.*

**COOLING THE EGGS**—Many operators run modern incubators successfully without paying any attention whatever to cooling the eggs, while other operators think it necessary to cool the eggs regularly each day from the start.

In this the operator will have to be guided by the air cell. It is not possible to give exact proportions of the air cell at the various stages of incubation, since it will vary greatly in different eggs. Much more depends upon the strength of the germs than any particular size of air cells, and where the germs are normally strong and vigorous the air space will be found to be developing uniformly. Very little thought need be given to the size of the air cell, provided it shows gradual development as the



hatch progresses. All unnecessary fussing with the eggs in the incubator should be avoided. The time that might be given to fussing with the eggs could be much better and more profitably spent in looking after the conditions under which the breeding stock is kept, and devoted to giving them intelligent, common-sense care. If the stock is all right the eggs will be all right. Once each day it will be a good plan to cool the eggs a little while turning them. This may be accomplished in a few minutes during the earlier part of the hatch and may be prolonged fifteen minutes or even longer in hot weather, during the latter part of the hatch. WHEN AN EGG PLACED AGAINST THE EYELID FEELS NEITHER WARM NOR COLD IT HAS BEEN COOLED ENOUGH.

The door of the machine should not be left open while the eggs are being turned. Never leave the incubator while the eggs are out of it, since it is an easy matter to become busy with something else and forget the machine for a time. Such carelessness will result in a poor hatch.

**TESTING THE EGGS**—Hen eggs should be tested twice during the hatch. To do this requires the aid of a properly constructed egg tester. The Cyphers Practical Egg Tester is the best on the market.

The **FIRST TEST** of hen eggs should be made at the end of the sixth or seventh day. On testing day the eggs should not be turned, as handling them while testing stirs them up sufficiently. Remove the first tray and close the machine. Carry the eggs in the tray to the testing room, where the tester has been previously lighted and made ready, and an empty tray provided in which to place the fertile eggs. By holding the eggs up to the opening in the tester, those containing live germs can readily be recognized. The infertile eggs will be perfectly clear. Those containing dead germs will not be so easy to distinguish, but with a little practice the operator will be able to identify them. The majority of dead germs will show merely a small red line adhering to the inside of the shell, or a broken circle of red or brown containing a small dark spot, which is apparently fixed at one side of the shell.

The strong, living germs will readily be recognized by their containing a small, spider-like body. The embryo chick appears as a dark, irregular shaped floating spot, which, with a strong light, can be seen to pulsate; and radiating from this, giving it a spider-like appearance, are a number of red blood vessels. If this is not seen at first it can readily be discovered in a living egg by turning the egg slowly before the opening in the tester. With a little practice the operator will soon be able to tell, almost as rapidly as he can pass them before the tester, the good eggs from those which should be discarded.

When the tray has been tested out, the live eggs should be returned to the machine and the other tray tested in a like manner. If the testing is done in a cool room, it will be wise for the operator to use a soft woolen blanket to cover the tray of eggs while testing them. In a well-constructed incubator cellar, with a person ordinarily expert at testing, the eggs will require no protection. The infertile eggs tested out should be thoroughly cooked and fed to the growing or laying stock. The eggs containing dead germs should be buried, as they are not fit for food.

The second test for hen eggs should be made about the seventeenth or eighteenth day of incubation. The eggs will now present a very different appearance, the lower portion of them being almost wholly dark and opaque, while at the large end a considerable air space can be seen. Those eggs showing a fair-sized air space with the balance of the egg dark, without any streak-



iness or watery appearance as the eggs are moved before the light, contain live chicks. The eggs that have failed to develop since the first test, or any dead germs which may have been missed, will easily be recognized after a few live eggs have been examined; since they will not show development, or will appear streaky and watery, and some may even give off a foul odor. These eggs which smell badly contain dead germs which have begun to putrify. Any eggs about which the operator is doubtful may be left in the machine with the live eggs, but all those which he is positive contain dead germs should be thrown out.

Interference at hatching time will not do any good. If the machine has been properly run, and if the eggs are what they should be, every egg will hatch that is fit to hatch. If there have been errors or mistakes during the period of incubation they cannot be remedied on hatching day. Opening the incubator door while the process of exclusion is going on may seriously injure the chicks, since by opening the door a considerable amount of heat and moisture is permitted to escape from the machine and cold air admitted. The only safe rule at hatching time is to let the machine alone and not interfere with it. The lamp should be filled on hatching day as on other days. The thermometer should be noticed to see if the heat is about right, and the lamp flame adjusted accordingly. When the chicks are coming out lively the temperature may rise as high as 104 or even 105 degrees. Should it run above 105 degrees it will be a good plan to turn the lamp flame down slightly.

Leave the chicks in the machine until they are thoroughly dry. At the end of the twenty-first day all the chicks which are worth anything will be out of the shells, and the egg trays containing the egg shells, and the eggs which have failed to hatch, should be removed from the machine to give the chicks more room. The chicks should not be removed from the incubator until the twenty-second day, as they will be better fitted to make a good life of it if they spend from twenty-four to thirty-six hours in the machine after hatching.

The exceptions to the above rules are: If the hatch promises to be a large one and the chicks appear crowded, open the ventilator slides in the bottom of the machine when the hatch is about two-thirds off, as nearly as can be judged by viewing it through the glass of the door. If the chicks are very crowded and appear to be well dried off, it will not be wise to leave them all in the machine over night. Open the door and quickly remove a number of dry chicks and the empty shells. Close up the machine and place these chicks in the brooder, and allow the balance to remain in the incubator the usual time limit. Do not attempt this until the hatch is at least two-thirds over.

Unless the drawers are uncomfortably crowded, allow the chicks to remain in the machine for twenty-four hours. When the hatch is over all ventilators should be opened, also the door wedged ajar if necessary to provide sufficient air until chicks have dried out.

**INCUBATING DUCK EGGS**—Duck eggs require a little different treatment during incubation than do hen eggs. Chiefly for the reason that the eggs have to remain longer in the machine, as the period of incubation is longer. Hen eggs require but twenty-one days of incubation while duck eggs average about twenty-eight days for the common varieties. Muscovy duck eggs take nearly five weeks to hatch, while goose eggs usually average about thirty days, and some varieties require about five weeks. Duck eggs, to do well, require cooling for from fifteen minutes to half an hour at least once a day during the first part of the hatch, while



during the latter part of the hatch they should be cooled for a like period of time, twice a day, according to the temperature of the incubator room, at the night turning. The ventilators should run closed for the first two or three days, then half open until the eggs begin to pip, at which time close down entirely. They may be opened again when the hatch is two-thirds over. Ventilation should be increased considerably when operating in a damp place.

Duck eggs should be tested more frequently than hen eggs. Three or four tests during the hatch being necessary, the first test may be on the fourth or fifth day, when the embryo duck can be readily seen through the clear shell of the egg, if a good tester is used. After the first test a few eggs should be examined every day or two, to see how the hatch is progressing, and if any foul odor is noticed on opening the machine, the rotten eggs should be tested out and removed. For the beginner it will be necessary to examine the eggs with a tester or else "smell them out" in order to find the eggs which give rise to the foul odor. An expert operator can tell the putrid eggs by the changed appearance of the shell almost at sight; for, as a rule, the putrid eggs show a slightly bluish or discolored marbled appearance on some portion of the shell, which is not found in the eggs containing live, healthy germs. Duck eggs become putrid very quickly after the germ dies, and give off foul gases which endanger the lives of the little birds in the remaining eggs.

**HATCHING GOOSE EGGS**—Goose eggs can be successfully hatched in a modern incubator, although few but experts at artificial incubation have attempted this. Owing to the length of time that goose eggs have to remain in the machines, the size and thickness of their shells, they require more careful attention than do hen or duck eggs. It will be necessary to run the bottom ventilators of the machine open from the start of the hatch until the eggs begin to pip. As the eggs are very large, and may interfere with the thermometer in its usual position, a new wire should be bent up on which to hang it, leaving the thermometer in same location, but with the bottom of the bulb  $2\frac{1}{2}$  inches above the wire-cloth bottom of the tray,— $\frac{1}{2}$ -inch higher than with hen or duck eggs. Care should be taken to keep the temperature just right, as these large eggs, after they begin to warm up radiate a considerable amount of heat. Run the machine at  $102\frac{1}{2}$  degrees at the start, and do not let it run above 103. Goose eggs will need a considerable amount of cooling or airing in order to do well, and in this the air space will have to be used as a guide. If it develops in size gradually and steadily throughout the hatch the eggs can be considered to be doing well.

After the first week it will be necessary to supply moisture for goose eggs, whether they are incubated under hens or in a machine. The eggs may be sprinkled with luke-warm water every other day, at first, and later, daily, using an ordinary florist's sprayer or a whisk broom dipped in water for sprinkling the eggs. The water should be at a temperature of about 90 to 100 degrees.

A breeder and authority on geese recommends that the eggs be either sprinkled every two or three days after the first week or put in water at a temperature of about 95 to 100 degrees for about thirty seconds. This application of moisture becomes still more important as incubation progresses and it should receive attention until the eggs begin to pip. By giving the eggs good care throughout the hatch, there will be no difficulty in hatching all the hatchable eggs. The goslings will remain quiet in the shell for some time after pipping. If they fail to leave the shell, after the bulk of the hatch is off, they may be easily helped out and will usually do well.



As goslings require a greater amount of fresh air than either chicks or ducks, it will be a wise plan to remove them from the machine soon after they leave the shell, and permit them to finish their drying off process in an up-to-date brooder, which has been previously made ready and running at a temperature of about 100 degrees under the hover. The chief requirements for a newly hatched gosling are a comfortable bed, plenty of fresh air and warmth, and an opportunity to sleep and digest the food that he has brought into the world with him. They will soon get strong in their legs and gain an appetite for any good, succulent, green food.

The No. 3 Standard Incubators, latest pattern, are equipped with a top ventilator. This ventilator is for use when a duck or goose hatch is coming off. This is to supply fresh air to the egg chamber and is not to be used in hatching hen eggs.

**CLEANING UP**—After the hatch is off and the chicks have been removed to the brooder, the machine should be cleaned out before another hatch is started. Remove the burlap diaphragm and give it a thorough brushing with a good stiff brush. If it is very dirty, it can be washed with warm water and soap with 5 per cent. Napcreol added, and set on edge to dry, or the burlap may be replaced by other clean material of the same sort at a very small cost. The trays should be thoroughly cleaned by washing with warm water, to which has been added a small amount (5%) of Cyphers' Napcreol. This may be best accomplished by using an ordinary scrub brush, and the egg shells, eggs which failed to hatch, and other debris, should be removed from the incubator cellar and buried. The lamp should be carefully cleaned, the burner washed and thoroughly cleaned in warm water containing considerable baking soda or saleratus, and the old wick replaced by a new one. The glass in the incubator door should be washed and polished so that the interior of the machine can easily be seen through it. A large hatch of either chicks or ducks will cause moisture, down, and other matter to be deposited on the glass and make it so dirty that it will be almost impossible to read the thermometer through it unless it is cleaned. If the lamp has smoked at any time during the hatch, clean the soot out of the heater. See that the machine is working all right and warm it up carefully until the regulator is properly adjusted before starting another hatch. A little attention to details in caring for incubators will prove a saving in both time and money, through the ease with which the machines can be cared for, and the preservation of the machine itself by giving it good care.

**PEDIGREE TRAYS**—When it is desired to use Cyphers Pedigree Trays, the eggs should be marked with pencil when they are placed in the machine, **USING THE REGULAR TRAYS UNTIL THE LAST TURNING**, when the eggs should be sorted out according to pencil marks and placed in the various compartments of the pedigree trays. Do not attempt to slide the No. 0 or No. 1 pedigree trays on the runners used for the regular trays, but let them rest on the burlap bottom of the egg chamber. They will then slide into place without interfering with the thermostat. The No. 2 and No. 3 Pedigree Trays are provided with guides to slide on the regular egg tray runners. Thermometer should be placed in slotted block attached to tray.

### HOW TO USE VENTILATORS AND DROP-BOTTOM

The following rules should be observed when operating under normal conditions:

Less ventilation is required in a very dry room—more when the machine is operated in a damp place.

White eggs usually require less ventilation than brown ones.

(1) When this pattern of incubator is operated in a temperature of 45 degrees, keep ALL ventilators closed at all times, trusting implicitly to the AUTOMATIC ventilation of the machine through the forced-draft, return current of the heater, which supplies warmed, FRESH AIR to the machine when it is operated in a cold apartment, and all ventilators are closed tight.



(2) When operated in a temperature of from 45 to 55 degrees, the wooden slides over the ventilating holes in the bottom of the machine should be closed until the 8th day, open one-half from 8th to 15th day, wide open from 15th day until chicks begin to pip, then close them tight until the hatch is completed.

(3) When operating in a temperature of 55 to 65, open slides one-half at the time eggs are put in, and increase to wide open the 8th day, closing them when chicks begin to pip.

(4) When the temperature of the room is above 65 run with ventilators wide open until chicks begin to pip—then close.

The No. 2 and No. 3 latest-pattern Standard Cyphers Incubators are equipped with drop-bottoms in addition to the regular ventilating slides. The bottom may be let down any distance until it touches the floor by merely turning the iron buttons underneath the machine at the front.

When the machine is operated in a temperature of 65 to 90, lower the drop-bottom to the floor and leave it open as long as the temperature of the apartment does not drop below 60 degrees. Close the drop-bottom and the ventilators when the chicks begin to pip.

When the bottom is down the whole felt bottom of the nursery is exposed, thus materially increasing the ventilation in warm weather, when the circulation of air through the hatching chamber is slow. When the temperature of the room in which this pattern of Cyphers Incubator is used, rises ABOVE 70 DEGREES we recommend that the drop-bottom BE LET DOWN until it rests upon the floor. It may be left in this position night and day, in a temperate latitude, during May and June. If the temperature should drop to 60 during part of the time while the drop-bottom is let down, no harm will be done—none whatever.

If our operators will bear in mind the following, it will help them materially in overcoming the moisture problem.

*Remember that: the wider the slides are left open, the greater will be the evaporation of the natural moisture from the eggs; the more the slides are closed down, the less will be the evaporation.*

The circulation of warmed air through the Standard Cyphers Incubator is SLOWLY DOWNWARD, thus preventing any in-rush of cold air from below. What fresh air does enter the hatching chamber from below finds its way there ALMOST IMPERCEPTIBLY. It has to work upward through the heavy, woolen-felt, lower diaphragms and the burlap bottoms located in the nursery trays, and AGAINST the gentle but positive DOWNWARD movement of the body of heated air in the nursery apartment



No. 2 Standard Cyphers Incubator, Latest Pattern (No. 3 same pattern), showing method of removing diaphragms without interference with thermostat or other working parts. "Drop-bottom" open.



and hatching chamber. By the intelligent use of this drop-bottom, during the warm months of the hatching season—May and June—we expect careful operators to increase their hatches fully 10 per cent., and oftentimes more than this.

**COMBINATION MACHINES**—The No. 3 latest-pattern Standard Cyphers Incubators are combination hen-egg and duck-egg machines. Extending downwardly through the top of the No. 3 machine will be found one inch-and-a-quarter tin tube that is covered at the top with a metal slide. This is for use in "DRYING OFF" DUCKLINGS when the hatch is well under way. Experienced duck men have found this method of extra ventilation to be both practical and necessary. In a moderately cold apartment the ventilating holes in the bottom of the machine should be opened when the nursery trays begin to fill with ducklings; whereas, in a warm apartment, or during warm weather, the drop-bottoms should be lowered, thus furnishing ample fresh air for the numerous lusty ducklings. This EXTRA TOP VENTILATOR IS NOT NEEDED AT ANY TIME, UNDER ORDINARY CONDITIONS, FOR HATCHING HEN EGGS. Under all ordinary conditions where HEN EGGS are being hatched, these ventilators should be let alone—i. e., SHOULD BE KEPT CLOSED TIGHT.

### REMOVABLE DIAPHRAGMS

The latest-pattern Cyphers Incubators are equipped with removable diaphragms, which greatly facilitate cleaning. The top diaphragm should be removed at least once each season for sunning and airing. It should be given a thorough brushing on both sides with a stiff brush, then allowed to remain out doors in the sun for several hours. When replaced in the machine it will be in as good condition as when the incubator was new. To remove the top diaphragm, turn the buttons in the front part of the machine, which hold the upper diaphragm in place, and slide the diaphragm out on the cleats provided for the purpose. The diaphragm may be replaced simply by reversing the operation.

To remove the diaphragm in the latest-pattern Cyphers Incubator, it is not necessary to remove the thermostat, nor even disturb the adjustment of the regulator.

The lower diaphragm of the Standard Cyphers Incubator, latest-pattern, is in two pieces, and is known as a "split diaphragm." To remove these in the No. 0 and No. 1 machines, simply take out the egg trays, first lifting out the burlap half of diaphragm; then lift up the lower or felt half; and remove it. In replacing the lower split diaphragm, remember that the felt always goes in first, felt side up, afterwards the burlap half should be placed in position. For management of diaphragms in No. 2 and No. 3 machines, see directions, under heading "Nursery Drawers" (page 18).

Once each season, replace the burlap of the lower diaphragm with new, or, if the machine is in constant use, renew the burlap as often as it becomes badly soiled. *Remove all dust which may accumulate between the burlap and felt of the lower diaphragm.* A surprising amount of dust, down and other matter accumulates in this space after every hatch, and it is absolutely necessary that it be removed in order to have the machine operate properly. Any considerable accumulation of dust and dirt between the burlap and felt will interfere with the proper circulation of air through the machine. *Do not neglect this important point.*



## NURSERY DRAWERS

In addition to the foregoing directions, which apply to all latest-pattern Standard Cyphers Incubators, the following directions are for the No. 2 and No. 3 patterns, which are equipped with nursery drawers:

The drawers are reached through solid wooden doors in front, below the glass panel door of the egg chamber. The bottom of each drawer is covered with felt, protected by wire, and inside the drawer is a removable burlap bottom.

The drawers should be placed in the incubator bottom side up, and left in that position until the hatch is well under way, when the drawers should be turned bottom down and the trap in tray turned back so that the chicks can fall through into the drawers.

WHEN THE NURSERY DRAWER IS PLACED IN THE MACHINE it strikes guide rails on both sides of the compartment. These rails raise the back end of drawer until it almost strikes the egg tray at the rear. The drawer should be pushed back as far as it will go; the front should then be raised to a level with the rear end. Then, the wire support should be turned up. This will hold the drawer level and lock it in proper position to catch the chicks as they fall from the trays at hatching time.

The nursery doors must be closed after the drawers are removed so as not to reduce the temperature of the egg chamber.

Should it be necessary to wash or repair the interior of the machine, remove the egg trays, nursery drawers and diaphragms; lay the machine on its back and open the drop-bottom, when the whole interior will be exposed.

## OPERATING THE CYPHERS INCUBATOR IN HIGH ALTITUDES, LIKE COLORADO, UTAH OR MONTANA

Under all ordinary atmospheric conditions the Standard Cyphers Incubators are strictly non-moisture machines, requiring no supplied moisture. In high altitudes or exceptionally dry locations it is sometimes necessary to supply moisture to the air used by the machine to offset the abnormal dryness of the atmosphere.

When the air is dry and rarified it will be found advisable to place the incubator in as cool a basement room as can be found; one with a clean cement floor is best. This room should be well ventilated, or the air near the floor (and in time up above the machine) will become foul and smother the eggs. A room with a cement floor can be kept perfectly clean, and the floor should be sprinkled once or twice a day so as to wet it thoroughly. It will be necessary to keep the floor perfectly clean, and the room well ventilated, or mold-germs will accumulate and poison the air. If the incubator is placed in a room above ground, it is a little easier to ventilate the room, although such a room is liable to get pretty warm through the day after the warm weather comes on. The air in such a room can be moistened by hanging up wet cloths, but we prefer the cement floor and the cooler basement. Do not put moisture in the incubator under any consideration. If moistening the air in the room will not effect a good hatch, remove the tray from the incubator once a day up to the nineteenth day, and sprinkle the eggs lightly with water warmed to a temperature of about 90 degrees. Use an ordinary whisk broom, dampen the end slightly, and spray the water over the eggs. An ordinary small rubber-bulb spray, such as is used in spraying house plants, is the best. Air and cool the eggs from five to twelve minutes, after which wet them thoroughly as per our direction above, when they can be put back. This will sometimes bring out a good hatch in a rarified atmosphere when it cannot be brought out in any other way.

Eggs that are being accumulated for incubation should be kept in a place where they will dry down as little as possible.

A great many poor hatches are due to the improper handling of the eggs before they are placed in the incubator.



## HINTS TO AID THE OPERATOR

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### WARMING UP

Question 1. Have had the machines going two days, but cannot get the mercury in the thermometer to rise.

Answer. When the thermometer is not broken and the temperature in the incubator remains steady and the desired heat cannot be obtained, the cause will always be found in the adjustment of the regulator. Keep the small steel nut on top of the wire rod so loose that it will stand one-half inch away from the pivot casting. See that the tin disc lies flat on the waste flue on top of the heater. If this is done the machine cannot help heating up. If you think that the nut is loose and the disc flat down, and still the machine does not heat up, look again, and the chances are that you will find yourself mistaken. When the temperature is up, adjust the regulator according to the directions. When the heater has become smoked up through careless adjustment of the lamp flame, clean the heater thoroughly as explained elsewhere, or the machine will not heat up easily. If the burner has become thoroughly blackened, boil it in a strong solution of washing soda, and scour it with handsoap, or get a new one. A black burner absorbs the heat instead of reflecting it, becomes easily overheated and likely to smoke.

### REGULATION

Question 2. Regulator will hold the temperature until the eggs are turned, but then the temperature will not come back.

Answer. If, after the eggs have been turned and put back into the machine, the operator will leave the regulator without change, if it has been previously running steadily at the required temperature, it will always come back to that point, as soon as the eggs have recovered the usual temperature. When the eggs are removed, and during turning, they lose considerable heat, and it takes some time after they are returned to the machine before they absorb sufficient heat to get back to the desired temperature. The tin disc will always rise from the top of the heater before the mercury in the thermometer indicates the required tem-



perature. This comes from the fact that while the air in the incubator has reached the usual point, say 103 degrees, and has acted upon the thermostat, thus throwing up the disc, the eggs have not yet absorbed sufficient heat to make them as warm as the air which is working the thermostat. The bulb of the thermometer, being in close proximity to the cooler eggs, registers the temperature of the eggs rather than the temperature of the air in which the eggs are placed. The obvious thing to do is to go away and forget that you have such a thing as an incubator, and at the next time of turning the eggs you will find everything running along smoothly and the temperature at the required point. Sometimes operators jar the regulator when shutting the door of the machine after turning the eggs, and cause the knife-edge bearings to ride up on one side or the other, and then the regulator acts at a different temperature. Care should be taken to close the door without a jar. We now make the bearings in which the knife edges rest V-shape. Those who have old machines and are troubled by the pivot casting riding, can easily file a shallow V in the bearings by using a three-cornered file.

**Question 3.** The regulator varies, it does not keep the temperature steady.

**Answer.** If the regulating device has been adjusted according to directions and nothing has happened to break or strain the same since it left our factory, there should never be a variation of more than one degree except, possibly, just before hatching time. If the machine does not maintain an even temperature note the position of damper over heater. If the temperature rises and the damper does not follow suit, or, if the temperature drops and the damper does not fall back on the heater and throw all of the heat into the egg chamber the regulating device needs a thorough overhauling. First: Loosen the connecting rod from the thermostat, turn down the adjusting nut so that the connecting rod will not come in contact with thermostat. Grasp the thermostat in one hand and exert moderate pressure to discover if the leaves of the thermostat have been broken or the rivet at either end has become loosened and allows the leaves to slip. If the thermostat acts spring like under pressure it is in good condition. If a sliding motion is discovered remove the thermostat and tighten the rivet which is loose. After assuring yourself that the thermostat is in proper condition test the regulating arm to see that the counterpoise weight is properly located. Place some article like a piece of soap or a potato cut down to weigh exactly twelve ounces, on the upper end of connecting rod and note if this weight is just sufficient to raise the damper over heater very gradually. If it does not act in this manner adjust the counterpoise weight and lock nuts so that the damper will raise gradually with the twelve ounces applied on top of connecting rod. Next, turn back the adjusting screw allowing the connecting rod to come in contact with the thermostat and screw the connecting rod in place, then readjust according to directions given on pages 3 and 4 of this book, satisfying yourself in doing so that the threads on connecting rod and nuts are in perfect condition and do not slip and that connecting rod is not bent and does not chafe on side of tube.

**Question 4.** Why do I need to readjust the regulator several times to keep the heat down in my incubator?

**Answer.** During the first part of the hatch, the thermometer which hangs in place in the Cyphers Incubator registers somewhat higher than the temperature of the egg as it lies in the tray. The last part of the hatch, and after the animal heat begins



to radiate from the eggs, the mercury in the thermometer registers the temperature somewhat lower than the actual temperature of the egg as it rests on the tray. During the fore part of the hatch, the heat comes altogether from above down through the cloth in the top of the machine, and the thermometer is then nearer the source of heat than the egg, and naturally registers a trifle higher. After the animal heat begins to radiate from the egg, the mercury is getting the influence of the heat from two different sources, that from the incubator coming from the top and that from the eggs which is in close proximity to the bulb of the thermometer. The animal heat increasing as the germ develops, causes a rise in the temperature, which is indicated by the higher point registered by the mercury in the thermometer. This necessitates a readjustment of the regulator, which is effected by turning to the right the steel nut on top of the brass rod, thus raising the tin disc from the top of the heater, allowing the escape of enough surplus heat to lower the temperature in the machine to the required point, as indicated by the suspended thermometer. This readjustment will have to be made often enough to preserve the desired temperature. The greater the fertility and the stronger the vitality of the germ, the more animal heat will be generated and the greater the rise in temperature. This is a decidedly good sign and generally points to a good hatch.

### HATCHING TIME

Question 5. What causes so much moisture to gather on the incubator door when chicks are coming off, and should it be so or not?

Answer. When the chicks hatch they are naturally in a very wet condition. The air takes up this moisture as the chick dries off, and the temperature outside of the machine being lower than that on the inside, causes the moisture in the air to condense on the glass. Moisture is also exhaled in the breath of the chicks. It is better to let this moisture remain in the machine. The automatic ventilation will readily care for any surplus moisture.

Question 6. What causes the temperature to fall as the chicks are coming out?

Answer. All muscular movement generates heat. The struggles of the chick in its endeavor to break the shell and escape, cause a decided increase in the amount of animal heat generated and thrown off. After the chicken escapes from the shell these struggles cease, and this cessation of effort, when multiplied by the number of chickens which have escaped from the shell makes in the aggregate a considerable falling off in the heat generated by the struggle for exclusion, and this falling off must be registered by the thermometer. The drying off of the chicks will also cause a drop in temperature. The chicks are very wet when they leave the shell, and this water must be absorbed by the surrounding atmosphere. All evaporation requires heat, and as soon as the chicks are dry the temperature will rise.



Question 7. Chicks died at different stages of development, what is the cause?

Answer. When the eggs are incubated under anything like normal conditions and the germs die previous to the eighteenth day, it is a sure indication of either a lack of vitality, weak germs or of imperfect yolk-food, the most common causes for which are lack of exercise, improper feeding, and too close confinement of parent stock.

Question 8. A large percentage of chicks died in the shell just as they were ready to come out, and quite a few had pipped, but could not get out. Why did not these hatch?

Answer. The answers to this question are many, and must be indicated by the proportion of dead chicks to those hatched; and stage of development and condition of the dead chicks. A chick may live up to the twenty-first day, or even twenty-third day, and still not be able to reach a successful exclusion. Because it lived so long is not, taken alone, an indication that it was a strong germ, nor the fact that it had lived until the end of the period of incubation any proof that it was fully matured. It should be remembered that the pipping time, and from thence to the complete exclusion of the chicken, is the most trying period in the life of the embryo up to that time, that when previously the germ simply lies in a quiescent state at the time of exclusion motion and force must be exerted to break the shell. At this critical time, if the chick is not fully matured or is lacking in vitality, it cannot successfully break the shell, and many are unable to exert force enough to even pip the shell, while others die in the different stages of exclusion. In such cases there is no possible remedy except to get germs of sufficient vitality and stamina, and yolk food of the necessary properties to nourish them, in order to carry them through this critical period. An embryo chick fully ripened breaks the shell and leaves it as easily and clean as a well-ripened raspberry is plucked from the stem on which it grows. A strong, well-ripened embryo is ready for exclusion by the end of the twentieth day, and ought to be out and dry by the beginning of the twenty-first. That is, if you have a good lot of eggs, they should begin to pip by the last of the twentieth day, and all that will hatch should be out by the first part of the twenty-first. Ducks should pip the latter end of the twenty-sixth day and clean up late on the twenty-seventh, or very early on the twenty-eighth. If they begin to hatch much before this time they have had too much heat; and if much later, not enough. If they hatch on time and do not hatch well, the eggs are quite likely to be at fault; but if they do not hatch on time a good hatch cannot be looked for no matter how good the eggs. A good hatch of hen eggs should clean up in ten hours; duck eggs in twenty hours.

The temperature being kept at 103 and the hatch running early or late, may be caused by the thermometer being inaccurate; or not enough airing in warm weather; or too much exposure (while airing) during cold weather. We always use well seasoned tubes in the manufacture of our thermometers, and keep from one to two years' supply ahead of the mounting, but no amount of care in preparation and handling will always insure that the thermometer will reach our customer in condition to register perfectly, and remain so indefinitely. Carelessness on the part of the operator in settling the mercury when it becomes separated in shipping may leave a small portion of the mercury unnoticed in the top of the tube, when the thermometer registers low and

the eggs are given too much heat; or if the mercury column is parted near the bulb, it will register too high and the hatch will be prolonged. Glass varies in texture, and while it seldom shrinks much after twelve months from the sealing of the tube, it occasionally takes a freak and settles to such an extent that it runs the mercury up a half degree, or even more. We would, therefore, recommend the purchase of another thermometer for comparison, whenever the hatches fail to come out at the proper time. To test, immerse the bulbs of both thermometers, at the same time and close together, in water at 105 degrees, and stir gently so as to make sure that they both get exactly the same amount of heat imparted to them, noting the temperature of each carefully as the water cools.

When in the machine, the bottom of the bulb should hang just two inches from the wire cloth bottom of the tray.

With a correct thermometer hanging in the correct position and kept at a uniform temperature, the eggs may not have imparted to them the right number of heat units in twenty days, by reason of improper handling on the part of the operator.

A chick imperfectly ripened through lack of heat may look to be perfectly developed, but be too large and fill the shell almost completely; or it may not have had enough heat to allow it to even absorb the yolk. If over-ripened from high heat in cold weather, it will be shrunken, and the membranes dried down hard around the chick. The effect of too many heat units in warm weather is to cook the embryo, and when the egg is broken the contents will be foul and watery, although there may still be life. When a chick does not exclude at the time it should the membranes begin to shrink down around it, and it then has no chance to work its way out.

Question 9. I found a number of chicks stuck in the shell, and was obliged to open the machine to help them out. Did I do right?

Answer. No. A chick that is not strong enough to free itself from the shell is not strong enough to thrive after being helped out, and there is nothing gained by assisting them. While you are helping a few along you are injuring others by letting the moisture out and reducing the temperature, drying the membranes, and causing the unhatched chicks to cease their struggles toward liberation.

Question 10. After hatching, the chicks panted, and others looked as if they were dead. What was the cause of it?

Answer. The panting is caused by the high temperature, which, however, dries the mouth rapidly and does no harm. When a large hatch is coming off be sure and open the ventilators when it is two-thirds over, if they have previously been closed. The only time it is advisable to open the door and relieve them is when a very large hatch is coming off during warm weather, and it is two-thirds out by evening. It is then advisable to open the door and quickly remove as many of the dry ones as can be readily reached. If left over night they are liable to trample each other and smother. When hatching in pedigree trays, if the hatch is very complete, so as to pretty well fill the compartments, it is best to remove the dry chicks when the hatch is two-thirds over, or they are apt to blanket the entire bottom of the tray and thus shut off the circulation. Do not resort to removing the chicks,



however, until the hatch is entirely over, unless you see it is going to be absolutely necessary to prevent leaving them in over night, when the egg chamber is already too full. Less damage will usually be done by leaving them in than by opening the door of the machine, unless the room is excessively close and warm. In No. 3 latest-pattern machines are ventilator tubes for use in hatching duck eggs. These are fully described in the "Directions for Operating."

### THERMOMETER

Question 11. Do you think my thermometer is correct? One placed in the tray registers considerably lower than the suspended thermometer.

Answer. It is natural that it should. It is farther away from the source of heat. The thermometer hangs on the screw-eyes, which are placed for that purpose in the top of the egg chamber. When in position, the center of the bulb should be just two inches from the wire cloth bottom of the tray. In this suspended position the thermometer registers the air temperature, and this has been found by wide experience, the best method to pursue in operating an incubator constructed like the Cyphers. By this method the eggs are one and a half degrees lower in temperature at the beginning of the hatch than is registered by the thermometer; but, as the animal heat is generated, the egg temperature gradually rises until the normal heat is attained, exactly the same as with a hen incubating.

Make sure that the mercury in the thermometer is well settled, or it will register too high; and it follows that the egg temperature will be too low, the hatch drawn out and poor. The eggs should hatch on the twentieth and the beginning of the twenty-first day. If they hatch before, the heat has been too high. If the hatch drags past the twenty-first day, the heat has been too low, and may have been caused—the thermometer registering 103—(1) by the thermometer hanging with its bulb bottom more than two inches from the wire cloth bottom of the tray; (2) too much cooling; (3) an imperfectly settled mercury column in the thermometer, or an otherwise imperfect thermometer. To settle the mercury column, take the thermometer in the hand, bulb end downward, and throw the hand downward with a sudden jerk, until no air bubbles appear in the tube, and the mercury is solidly connected.

Question 12. How can I see the thermometer while the chicks are hatching, and the glass in the door is steamed up?

Answer. If the regulator has not been disturbed since hatching commenced, and has previously been taking care of the temperature, it will do no harm to leave it to itself for a time, even if you cannot see the thermometer. If you were able to see it at this time it would not benefit you, as the mercury is up and down on account of the chicks running about directly under the bulb. As the hatch progresses, the moisture will dry from the glass, and then if the temperature should be a little low and the hatch not entirely cleaned up, you can turn the heat up. Should egg shells be piled up in front of the thermometer so as to obstruct the view, open the door and quickly push them aside, and close the door.

Question 13. How far should the thermometer be from the eggs?

Answer. The directions plainly say that the center of the bulb of the thermometer should be exactly two inches from the wire cloth bottom of the tray in all manufactured up to and including 1905. In all 1906 and later machines the bottom of the bulb is two inches from the wire cloth directly under the thermometer. The thermometers, as furnished with the incubators, and suspended on the proper wire and screw-eyes, give this exact position. In case of very large goose eggs, the wire may be sufficiently bent to prevent the bulb of the thermometer from striking on the eggs. What little it strikes on duck eggs, or on extra large hen eggs, will do no harm if the tray is carefully pushed in place.

Question 14. Cannot read the thermometer. Will it do any harm to hang it nearer the door?

Answer. As a rule, very little trouble is experienced in reading the thermometer. A light may be used, and when the rays are directed on the mercury it is not difficult to read. Twice a day is as often as it is necessary to consult the thermometer and what little trouble is necessary for that purpose may be readily overlooked when it is considered how perfectly the machines operate, and that it is impossible to get any good thing without more or less effort. It is better to keep the thermometer suspended in the center of the machine than to change its position. We cannot guarantee satisfactory results if the thermometer is used other than as directed.

Question 15. Cannot see the thermometer when pedigree tray is in, nor pull the tray out without first removing the thermometer.

Answer. Since first sending out the pedigree trays, a change has been made and all the later trays have a block attached to one of the wire divisions. On the upper edge of this block there is a deep saw cut in which the edge of the thermometer rests, permitting the temperature to be readily observed from the front of the incubator, and also so doing away with any difficulty in the entrance or removal of the tray. If your tray lacks this block one will be sent you from the factory without cost.

### MISCELLANEOUS

Question 16. What is the proper size of an air cell?

Answer. We mistrust any directions which pretend to give the exact proportions necessary, or even desirable, in the air cells of eggs during incubation. There are so many conditions entering into the question, and good hatches are had from eggs which vary so widely in this respect, that we are averse to giving any definite size as being altogether requisite or necessary. Much more depends upon the strength of the germ than upon any particular size of air cell, and where the germs are normally strong and vigorous there need be very little thought given to the size of the air cell. Naturally, the contents of the egg adapts itself to the



necessary conditions which go to insure good hatching results. Where the natural vigor and stamina are weak, no mechanical art can, by any possibility, infuse the vitality which is lacking, and though the air cell may be made larger or smaller and its size varied by mechanical means, the results will be the same and no good hatch can be induced by this arbitrary method. In short, it is better to avoid all unnecessary fussing with the eggs. Rather give the time to overseeing the conditions under which the breeding stock is kept and give them all the intelligent care possible, to the end that because of abundant exercise and proper food the germs in the eggs may be full of health and life. When this end is reached, practically no attention need be given to the size of the air cells during the process of incubation. Nature will furnish all the means necessary to the desired end, and good hatching will be the rule rather than the exception.

Question 17. Will it do any harm to put a newspaper on the burlap tray to keep the chicks from soiling it when coming off?

Answer. Do not put paper on the burlap diaphragm to keep the chickens from soiling it when coming off. This is for two reasons. In the first place, the circulation of air in a Cyphers machine is from the top down through the felt, and through the burlap and felt diaphragm under the egg tray. Paper being impervious makes it impossible to get the proper circulation of air and hence hurts the hatching chances. In the second place, the paper is about the worst thing possible upon which to put young chickens. It is slippery and many are lamed by their struggles to stand or walk on it. The Cyphers Incubator has a special split diaphragm which can be readily cleaned after the hatch.

Question 18. The burner on my incubator lamp seems to be loose, letting the air in under the cone and causing it to smoke.

Answer. The burner we use is an exceptionally heavy and well made burner, and if handled with any sort of care, will last a long time. It cannot be loose and allow the air to get in under the cones unless it has been very roughly handled. See that the back or hinge part has not been spread, so as to hold that portion of the cone up above the base. If it has become bent, lay it on something solid, tap it gently with a hammer, bending it back into place so that the cone sets down flat. The little spring in front which holds the lamp cone down may have become loose, and if it has it can be easily riveted down tight again with a few light taps of a riveting hammer. This is unusual, however, and ordinarily bending the spring back toward the wick tube when the cone is raised will reset it, so that when the cone is pressed down again, the spring will snap into place and hold the top firmly in position. We find the usual trouble is that the operator does not see that the bracket which holds the lamp block and lamp in position, is at the proper angle, so as to bring the lamp up perfectly level under the center of the heater with the burner touching the chimney all the way around. If it does not, the lamp is liable to smoke and give trouble. Sometimes operators in their haste to put the lamp in position will get the edge of the burner caught on the edge of the central flue (or chimney) of the heater and go away and leave it in that position. This in the course of a few minutes, will cause the lamp to smoke very badly. This cannot happen with the latest pattern. The new guide-ring insures the lamp finding its correct position. If operators will always make

sure their lamp is in position and kept perfectly clean, there will be no more danger of the lamps smoking than there is with the ordinary house lamp. It is usually careless adjustment that first causes the lamp to smoke and makes most of the trouble. See that there is no accumulation of dirt between guide-ring and the cone of the burner in the latest pattern.

Question 19. Machine worked all right last year, but this season the lamp or heater smokes so I can do nothing with it. Have cleaned the heater, but it makes no difference.

Answer. When the heater smokes and the flame does not, it is caused by leaving the lamp with oil in it attached to the heater when in disuse, and the oil creeps up and soaks into the jacket which covers the heater. It will eventually do the same thing while in use if the burner and oil fount are not kept clean and free from oil. If the heater has accumulated considerable oil, so as to smoke badly, unscrew it from the machine and clean out the inside of the heater thoroughly as per the circular of directions. Then wash out with a cloth wet with a strong solution of sal soda and bake in a moderately warm oven until the heater and jacket are thoroughly dried out. It should then be as good as new. The burner should also be scoured.

Question 20. Glass in the incubator doors is cracked. Will it interfere with machine heating up?

Answer. A crack in the glass of the incubator door will not interfere with its heating up, nor is it altogether essential that the doors should fit so as to perfectly exclude all air. The construction and scientific ventilation of the Cyphers Incubators is so positive and correct that the admission of what little air could enter around a door which fits moderately close would not interfere, nor in any way hurt, the hatching qualities of the machine.

Question 21. Asbestos jacket around the heater of my machine is loose. Will it do any harm?

Answer. The asbestos jacket around the heater of the Cyphers Incubator is merely for the purpose of preventing loss of the heat. It prevents undue radiation, and is used for no other purpose. It follows that any looseness or any slight injury to the asbestos will not in any way interfere with the perfect operation of the incubator.

Question 22. The mica on my machine has become clouded with smoke. How can I clean it?

Answer. Clean with soft rag or tooth brush and a strong solution of washing soda—sal soda or vinegar. In all 1905 and later pattern machines the mica is removable. It may be drawn out with the thumb and finger and cleaned as above.

## HOW TO OPERATE CYPHERS BROODERS

Question 23. What should be the temperature in the brooder?

Answer. It should be about 95 degrees (under the hover) when the chicks are put in, and drop gradually to about 90 by end of first week; 85 by end of second week; then to 80 by end of third week. Something, however, depends upon conditions outside, and



the judgment of the operator must govern his management of the brooder to meet conditions. In cold, stormy weather and with brooder out-of-doors, two or three (or even five) degrees more than the normal heat for the period would be desirable, provided that it does not run above 100 the first week, nor above 95 degrees thereafter. This reservation is made because the chicks should be kept within the walls of the brooders the first few days and penned close to it the second week; after that time only a little more than the normal heat on cold, stormy days is desirable. In winter time, in a brooder house kept warmed to 60 or 70 degrees, a lower temperature under the hovers would be advisable than if the brooders are out of doors and the chicks running on the cold, damp ground. Similarly, during the warm days of May and June, there need be very little (or no) heat under hovers during the hours of warm sunshine; turn the lamps as low as possible without their going quite out, and open the lids of brooders a little, to let the fresh, outside air circulate. On warm spring nights it is an advantage to have sufficient warmth from the brooder stoves to permit brooder lids being up one-fourth to one-half inch, to increase the ventilation; give the youngsters an abundance of fresh air at all times.

**Question 24.** How many chicks can be put in one brooder?

**Answer.** Fifty are as many as should be kept in one brooder. When the chicks are very small (when newly hatched) a hundred can be put in a brooder which will be too small for them at two or three weeks old; they double in size very quickly and then the brooder which gave ample room to 100 is too small for more than 50; in the long run it pays to rate the brooder as carrying about 50 chicks.

**Question 25.** What causes weak legs in chicks?

**Answer.** A defective food ration, or lack of exercise. When chicks are fed a ration over-rich in fat formers and deficient in bone and muscle builders, the body grows faster than the bones and muscles of the legs, and becomes too heavy for the legs to carry; a balanced ration will prevent this. When symptoms of leg weakness are seen, add a little meat meal or beef scrap to the ration.

**Question 26.** What material shall I put on floor of brooder?

**Answer.** A half inch of finely cut clover, alfalfa, or chaff saved from the threshing, or sweepings from the hay loft floor, would be best. The clover or alfalfa leaves and chaff, or seeds, etc., from the hay loft, will give the chicks many a tidbit; the hay chaff or cut clover or alfalfa should be frequently renewed and the brooder kept clean and sweet.

Keep a supply of sharp, chick-size grit and a fountain of fresh, clean water always accessible to the chicks.

Question 27. Should the baby chicks be kept shut in the brooder at first?

Answer. That depends upon the weather. Early in the season, while the air is yet chilly, we would keep them shut in the brooder one or two days; after the first of May and in June we let them out into small pens (about a yard square) from the very first, when the day is sunny and warm.

Question 28. How long should chicks be kept in a brooder?

Answer. Six to eight weeks, according to the season and how well they are feathered. If the weather is warm they will be large enough at six weeks old to do without artificial heat, but early in the season, when the nights are still cold, eight weeks may be necessary.

Question 29. What causes my safety brooder stove to smoke?

Answer. Failure to keep it clean and properly trimmed. Keep the chimney clean and free from soot. See that the perforated plate about the burner is clean and that the holes in it are not plugged up. Filling the water pan too full will make the stove smoke. The water pan around the wick tube should be filled half to two-thirds full only; never fill so full that the water touches the iron casting, or all air will be shut off from the flame, and it will smoke and go out.

### WHY LAMPS SMOKE

In fully nine out of every ten cases an investigation shows that it is due to the use of oil not suitable for the purpose. In some localities it is quite difficult to secure an oil that is free from sulphur, and sulphur always means more or less smoke. Other districts are supplied with an oil that is called "too heavy" and produces a flame that is reddish with a dark edge. Such a flame deposits lots of carbon and requires frequent attention. Either of these oils burn quite satisfactorily in a house lamp because they burn but a short time and then the lamp is thoroughly cleaned, but an incubator or brooder lamp is quite a different proposition because it burns continuously weeks at a time and everything must be exactly right or the results will be unsatisfactory.

Other points to which we desire to call your attention are:

First. Do not fill lamp too full of oil. If you do, the oil will expand and leak out of lamp bowl around burner. It will also shut off the supply of air which is intended to enter the vent in filler cap.

Second. Exercise great care in trimming wick. Cut off the charred portion of wick once every day, using top of wick tube as a guide, then turn the wick up an eighth of an inch and snip off both corners. If properly done flame will appear round, full and clear; a forked or uneven flame will cause trouble.



Third. Be careful not to bend wick tube when trimming wick. This tube must be perfectly straight and free from dirt and wick must fit it perfectly. If wick is small too much air will pass through at this point.

Fourth. Perforated metal around wick tube must be kept clean at all times and must not be left out.

Fifth. If cone of burner becomes bent, straighten it carefully—it affects the shape of the flame.

Sixth. Burner must fit snugly against bottom of heater.

Seventh. Do not touch heater with oily hands. Heater must be kept perfectly free from oil.

Eighth. See that mica is in place and is tight.

Ninth. There must be no drafts in room where operating, but it is absolutely necessary to have a supply of fresh air, otherwise eggs will not hatch and lamp will not burn properly, due to lack of oxygen.

Tenth. After a lamp has smoked the heater must be cleaned thoroughly. Special attention should be paid to the tube (F) connecting flues I and K. Flue H is the fresh air pipe and no smoke can get into it. The lamp cannot be made to burn properly if flues I and K and connection F are not perfectly clean. See answer to Question 19, in "Hints to Operators" for instructions how to clean heater thoroughly.

If your lamp smokes after you have assured yourself that the ten points mentioned have been observed you can make up your mind that the trouble is with the oil, and we suggest that you inform your oil man that you want an oil suitable for incubating purposes, and, if he cannot furnish it, obtain it from some one who has a different source of supply. If compelled to use a "heavy oil" it will help some if the oil remaining in the lamp at filling time is poured back into the can and the lamp filled with fresh oil.

*We desire to caution you about starting with a large flame. Allow the lamp to warm up and then if there is not sufficient blaze it may be increased.*

## INCUBATOR DON'TS

Don't use poor oil.  
Don't use a short wick.  
Don't buy a cheap incubator.  
Don't forget to test the eggs.  
Don't slam the incubator door.  
Don't tinker with the regulator.  
Don't turn eggs after filling the lamp.  
Don't heap up eggs in the incubator.  
Don't forget to fill and clean the lamp.  
Don't help the chicks out of the shells.  
Don't open the incubator at hatching time.  
Don't turn or cool the eggs after they begin pipping.  
Don't let the breeders get fat — keep them busy.  
Don't neglect to give your breeders lots of green food.  
Don't forget that old or immature stock produces poor eggs for hatching.

Don't turn the flame so high as to cause it to smoke.

Don't be in a hurry to take the chicks from the incubator.

Don't try to hatch hen and duck eggs in the same incubator.

Don't try to hatch eggs that you would not set under a hen.

Don't run the temperature too high ; it weakens the chicks.

Don't fail to clean up the incubator and leave it clean when done hatching.

Don't reset the incubator with trays foul and dirty ; clean and dry them thoroughly.

Don't leave the incubator door open if you take the eggs out of the machine to cool them.

Don't buy a second-hand incubator, unless given an opportunity to run it one hatch and prove its being all right.



## BROODER DON'TS

Don't use a short wick.

Don't let the chicks get chilled.

Don't let the chicks get lazy; keep them busy.

Don't turn the flame too high; it will make it smoke.

Don't forget that chicks need both shade and sunshine.

Don't let the baby chicks get far away from the brooder.

Don't overheat; too high temperature weakens the chicks.

Don't let the lamps get empty; fill and clean them daily.

Don't overcrowd; fifty chicks are enough for one brooder.

Don't make the chicks drink ice water; take the chill off.

Don't close the brooder too tightly at night; chicks need fresh air.

Don't let the chicks get too hungry; feed a little at a time and feed often.

Don't fail to air and sun the brooder and hover chamber daily; sunlight kills germs.

Don't trust chicks in a poor brooder; it will kill them faster than a good incubator can hatch them.



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